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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/077,548   | 02/14/2002  | Swahee N. Surve      | 005127.00138        | 3233             |
| 22909 7590 11/25/2008<br>BANNER & WITCOFF, LTD.<br>1100 13th STREET, N.W.<br>SUITE 1200<br>WASHINGTON, DC 20005-4051 |             |                      |                     |                  |
| EXAMINER   |             |                      |                     |                  |
| MUROMOTO JR, ROBERT H  |             |                      |                     |                  |
| ART UNIT   |             | PAPER NUMBER         |                     |                  |
| 3765   |             |                      |                     |                  |
| MAIL DATE  |             | DELIVERY MODE        |                     |                  |
| 11/25/2008   |             | PAPER                |                     |                  |

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**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

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*Ex parte* SWATEE N. SURVE

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Appeal 2008-1818  
Application 10/077,548  
Technology Center 3700

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Decided: November 25, 2008

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Before DEMETRA J. MILLS, LORA M. GREEN, and  
JEFFREY N. FREDMAN, *Administrative Patent Judges*.

MILLS, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134. The Examiner has rejected the claims for anticipation and obviousness. We have jurisdiction under 35 U.S.C. § 6(b).

## STATEMENT OF CASE

The following claims are representative.

1. A method of forming an article of wear, comprising:  
forming at least one electronic component on a fiber;  
interlacing the fiber with other fibers to form a piece of fabric; and  
forming an article of wear with the fabric.
2. The method of forming an article of wear recited in claim 1, wherein the at least one electronic component is deposited on the fiber by spraying stock materials at the fiber through a laser.
3. The method of forming an article of wear recited in claim 1, further comprising:  
forming a substrate over a surface of the fiber,  
wherein the at least one electronic component is formed over the substrate.
6. The method of forming an article of wear recited in claim 4, wherein the protective layer is a layer of shield material.
8. The method of forming an article of wear recited in claim 1, further comprising forming a shielding layer over the at least one electronic component.
12. An article of wear, comprising:  
a piece of clothing material; and  
at least one electrical component formed over a surface of the piece of clothing material.
16. The article of wear recited in claim 14, wherein the protective layer is a layer of shield material.
18. The article of wear recited in claim 12, further comprising:  
a shield layer formed over the at least one electronic component.
23. The article of wear recited in claim 12, wherein the clothing material is a natural or synthetic leather.

*Cited References*

|               |                 |               |
|---------------|-----------------|---------------|
| Carroll       | US 5,555,490    | Sep. 10, 1996 |
| Post et al.   | US 6,210,771 B1 | Apr. 3, 2001  |
| Miller et al. | US 6,251,488 B1 | Jun. 26, 2001 |

*Grounds of Rejection*

1. Claims 1, 3-22, 24 and 25 stand rejected 35 U.S.C. 102(b) as anticipated by Post.
2. Claim 23 is rejected 35 U.S.C. 102(b) as anticipated by Carroll.
3. Claims 2-3 are rejected 35 U.S.C. 103(a) as obvious over Post in view of Miller.

1. Claims 1, 3-22, 24 and 25 stand rejected 35 U.S.C. 102(b) as anticipated by Post. (Ans. 3.) We select claims 1, 6, and 12 as representative of the rejection before us since Appellant separately argues these claims but does not argue other individual claims in the groupings presented. 37 C.F.R. 41.37(c)(1)(vii).

ISSUE

The Examiner finds that Post describes an electronic component formed on a fiber. (Ans. 3.)

Appellant argues that Post fails to disclose an electronic component formed on a fiber as claimed. (App. Br. 6.)

Therefore, the issue is does Post describes an electronic component formed on a fiber.

### FINDINGS OF FACT

1. “The invention relates to the formation of electrical circuits on the surface of a fiber or other substrate material used to form an article of wear.” (Spec. 1.)
2. Post discloses the fabrication of electronic devices and circuits, and in particular to the integration of such devices and circuits into textiles (fabrics, clothing material). (Post, Abstract.)
3. Post discloses a fabric woven with non-conductive fibers in the warp and a conductive fiber in the weft. (Post, col. 4, ll. 15-51.)
4. “The conductive fibers 110 may be continuously adjacent along the weft (substrate). The leads of a resistor and a **capacitor** 122 (claim 11, 21), as well as the pins of an integrated circuit 124 are soldered to single fibers of the fabric 100 (col. 4, lines 15-51).” (Ans. 3 (quoting Post, col. 2, ll. 17-20).)
5. “A fabric comprising a woven matrix of conductive fibers running in both directions can be used to capacitively or electrically couple electronic components, or in sheet form can serve as an electrostatic antenna (claim 10, 20).” (Ans. 3.)
6. “To prevent fibers 110 from making unwanted contact as a result of folding, the fabric 100 may be provided with a non-conductive (insulating, protective, shield, claims 4-8, and 14-18) coating (e.g., a transparent acrylic coating that may be sprayed on) following affixation of the electronic components.” (*Id.* at 4; Post, col. 4, ll. 58-62.)
7. Alternatively, an insulating layer 135 may be applied to one or both sides of the fabric 100. Insulating layer can, if desired, be a textile with handling characteristics similar to those of the fabric 100 (Post, col. 4, lines 58-65).

“Electrically active textiles can also be created by sewing, embroidery or weaving of conductive material into a substantially non-conductive fabric matrix or substrate. (claim 3, 13)” (Ans. 4).

8. “Typically, the threads are formed by spinning together fibers of a polymer (plastic, claim 24) such as KEVLAR® with fibers of a metal.” (*Id.*; Post, col. 5, ll. 55-57.)

9. “Another embodiment uses an elastic (e.g., foam, claim 25) panel to provide resistance in a switching mechanism for the circuit.” (Ans. 4.)

10. “[T]he strips of conductor material may be coated with a semiconductor to form nonlinear thresholding elements at the overlap regions that prevent false contacts and/or phantom switching. The use of the semiconductor makes the electrical component a transistor, as recited by the applicant in claims 9 and 19.” (Ans. 4; Post, col. 8, ll. 45-49.)

11. According to Webster's Online Dictionary the term “on” means:

1 **a**—used as a function word to indicate position in contact with and supported by the top surface of <the book is lying *on* the table> **b**—used as a function word to indicate position in or in contact with an outer surface <the fly landed *on* the ceiling><I have a cut *on* my finger><paint *on* the wall> **c**—used as a function word to indicate position in close proximity with <a village *on* the sea><stay *on* your opponent> **d**—used as a function word to indicate the location of something <*on* the left><*on* the south side of the house><*on* the farm> .

(<http://mw1.merriam-webster.com/dictionary/on>).

## PRINCIPLES OF LAW

The standard under § 102 is one of strict identity. “Under 35 U.S.C. § 102, every limitation of a claim must identically appear in a single prior art

reference for it to anticipate the claim.” *Gechter v. Davidson*, 116 F.3d 1454, 1457 (Fed. Cir. 1997). “Every element of the claimed invention must be literally present, arranged as in the claim.” *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). “Without evidence in the patent specification of an express intent to impart a novel meaning to a claim term, the term takes on its ordinary meaning.” *Optical Disc Corp. v. Del Mar Avionics*, 208 F.3d 1324, 1334 (Fed. Cir. 2000). “Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

## ANALYSIS

As to claims 1 and 12, Appellant argues that

the Post et al. discloses four structures that might possibly be interpreted as electronic (or electrical) components: (1) the fibers themselves, (2) electrical components formed by multiple fibers working together, (3) the separate electrical components attached to the fibers, and (4) the circuit formed by the combination of the fibers with the separate electrical components. Each of these structures is patentably distinguishable from the claimed invention.

For example, if the Examiner is interpreting a conductive fiber of the type disclosed by the Post et al. patent to itself be an electronic component, then this fiber cannot also be considered an electronic component formed on a fiber as recited in claims 1 and 4-11. That is, a fiber cannot be formed on itself. Accordingly, this interpretation cannot be stretched to anticipate the express language of claims 1 and 4- 11.

Similarly, an electronic component formed by multiple fibers of the type disclosed in the Post et al. patent (e.g., a capacitor or conductor) also cannot be construed as an electronic component formed on a fiber. Instead, it can at most be characterized as a single electronic component incorporating a fiber, or as a group of electronic components positioned adjacent to each other.

With regard to the separate electrical components disclosed by Post et al. patent, this patent does not teach or suggest forming any of these separate components on a fiber as recited in claims 1 and 4-11. Instead, the Post et al. patent inherently teaches that these electrical components are formed elsewhere, and then subsequently welded or otherwise attached to a fiber.

Finally, with regard to a circuit created by attaching a separate electrical component to a fiber taught by the Post et al. patent (which appears to be the interpretation of the Post et al. patent relied upon by the Examiner), Appellant likewise submits that this combination cannot be considered an electronic component formed on a fiber, as expressly recited in the claims. At best, it can only be construed as an electronic component that incorporates a fiber.

(App. Br. 5-6.)

We are not persuaded by Appellant's argument. Claim 1 requires three method steps:

1. forming at least one electronic component on a fiber;
2. interlacing the fiber with other fibers to form a piece of fabric; and
3. forming an article of wear with the fabric.

The Specification does not provide a specific definition of the terms "forming" and "on," as claimed. We give the terms, particularly the term "on" its ordinary meaning of, "used as a function word to indicate position in contact with and supported by the top surface of." (FF11.)



Post teaches forming at least one electronic component on a fiber. (FF4; Post, col. 4, ll. 15-51.) Post teaches interlacing the fiber with other fibers to form a piece of fabric. (FF3; Post, col. 4, ll. 15-51.) Post teaches forming an article of wear with the fabric. (FF2; Post, Abstract.)

We find that soldering an electronic component to a fiber is “forming at least one an electronic component on a fiber” (claim 1) consistent with the ordinary meaning of the word “on.” (FF11.)

#### CONCLUSION OF LAW

Post describes an electronic component formed on a fiber. The rejection of claims 1 and 12 is affirmed. Claims 3-5, 7, 9-15, 17, 19-22, 24, and 25 fall with claims 1 and 12.

Claim 6, 8, 16 and 18

#### FINDING OF FACT (CONT.)

12. The Specification, page 8, states that the “shielding layer 227 is made from a conductive material.”

#### ISSUE

The Examiner has rejected claim 6 based on the non-conductive coating disclosed in Post. (*Id.*)

Appellant contends that claim 6 recites a shield layer which is a conductive material. (App. Br. 8.)

The issue is does Post disclose a shielding layer.

### ANALYSIS

Appellant argues that electronic shielding is typically formed of a conductive material. (App. Br. 8.) Based on the Specification, which specifically notes that the shielding layer is made from a conductive material (FF12), it would reasonably appear that one of ordinary skill in the art would understand the term “shield” in the claims to refer to electronic shielding which is a conductive material.

We do not find that the Examiner has established a prima facie case of obviousness with respect to claim 6, as the Examiner has failed to indicate a shielding layer, as claimed.

The rejection of claims 6, 8, 16, and 18 is reversed.

### CONCLUSION OF LAW

We thus find that Post does not disclose a shielding layer.

2. Claim 23 (dependent upon claim 12)<sup>1</sup> is rejected 35 U.S.C. 102(b) as anticipated by Carroll. (Ans. 4.)

### ISSUE

The Examiner finds that Carroll discloses a leather garment having a signal transmission system. (Ans. 4-5.)

Appellant contends that Carroll does not disclose an electrical component formed over a surface of clothing. (App. Br. 10.)

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<sup>1</sup> While not specifically stated, we assume this rejection also applies to claim 12 upon which claim 23 is dependent.

The issue is therefore, does Carroll disclose article of wear with all the limitations of claim 12 wherein the clothing material is natural or synthetic leather.

#### FINDINGS OF FACT

13. Carroll discloses, “[a] microcomputer support and interconnection structure **10** in accordance with the present invention broadly includes a pliable garment **12**, a plurality of microcomputer card pockets or enclosures **14, 16, 18**, arranged in a predetermined pattern and a linking or signal transmission system **20**.” (Carroll, col. 3, ll. 52-62.)

14. “The garment **12** and the pockets **14, 16, 18** may be constructed of the same type of cloth or other pliable material or may be composed of different types of body conforming, pliable material such as are commonly used in the manufacture of garments.” (Carroll, col. 3, ll. 58-62.)

15.

The garment **12** is composed of one or more layers **30** including structure defining a plurality of channels **32**. . . . The channels **32** extend between and into each of the pockets **14, 16, 18** in a predetermined sequence. The channels **32** present a characteristic width of sufficient size to encase a flat flexible *substrate* such as ribbon cable common in the computer industry.

(Carroll, col. 3, l. 65 to col. 4, l. 7 (emphasis added).)

16. “The sequence of the channels **32** is dependent on the functional configuration of the microcomputer system chosen by the user.” (Carroll, col. 4, ll. 7-9.)

17. “Channels 32 may be defined by a plurality of layers 30 or may be defined by a plurality of securing loops. The securing loops, for example, are made by securing string or thread to mesh or net fabric.” (Carroll, col. 4, ll. 10-13.)

18. Carroll states that the support or interconnection layer can be composed of cloth or leather, as leather is a common, low price pliant material for garments. (Carroll, col. 7, ll. 25-27.)

19. The computer system and linking systems and channels of Carroll are brought together to form electronic components and are “‘formed over a surface of the piece of clothing.’” (Carroll, Abstract; Ans. 5.)

20. The term “formed” has no special meaning assigned to it by the applicant in the Specification. (Ans. 5.)

## PRINCIPLES OF LAW

The standard under § 102 is one of strict identity. "Under 35 U.S.C. § 102, every limitation of a claim must identically appear in a single prior art reference for it to anticipate the claim." *Gechter*, 116 F.3d at 1457. "Every element of the claimed invention must be literally present, arranged as in the claim." *Richardson*, 868 F.2d at 1236. "Without evidence in the patent specification of an express intent to impart a novel meaning to a claim term, the term takes on its ordinary meaning." *Optical Disc Corp.*, 208 F.3d at 1334. "Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history." *Vitronics Corp.*, 90 F.3d at 1582.

### ANALYSIS

Appellant contends that Carroll does not teach an electrical component formed over a surface of a piece of clothing material. (App. Br. 10.)

We are not convinced by Appellant's argument.

Claim 12 requires 1) a piece of clothing material and 2) at least one electrical component formed over a surface of the piece of clothing material. Claim 23 further requires that the clothing material is natural or synthetic leather.

Carroll describes a piece of clothing material which is leather. (FF18.) Carroll describes at least one electrical component formed over a surface of the piece of clothing material. (FF15, 17.)

### CONCLUSION OF LAW AND DECISION

Thus, Carroll discloses an article of wear with all the limitations of claim 12 wherein the clothing material is natural or synthetic leather. Carroll describes each and every element claimed and the anticipation rejection is affirmed.

3. Claims 2-3 are rejected 35 U.S.C. 103(a) as obvious over Post in view of Miller. (Ans. 6.)

### ISSUE

The Examiner finds that it would have been obvious to modify Post to use a spray deposition process as taught by Miller rather than soldering, for more precise deposition of electronic materials onto small areas such as fibers to be woven into fabric articles. (Ans. 7.)

Appellant contends that Post does not disclose forming an electrical component by spraying materials at a fiber through a laser and there is nothing in Post to suggest using the deposition technique of Miller. (App. Br. 9.)

The issue therefore is, does the cited prior art, in combination, discloses spray deposition of electronic materials, and is their motivation to combine the cited references.

#### FINDINGS OF FACT

21. Post does not teach “using a laser spray process to form the electrical components on the fibers and the use of a substrate over the fibers.” (Ans. 6.)
22. Miller teaches “a laser spray deposition process to affix electronic components to surfaces such as metals, plastics, polymer resins, glass, and the like. The process allows the advantage of very precise direct deposition of electronic components into small areas.” (Ans. 6; Miller, col. 5, ll. 34-38.)
23. Synthetic fibers are polymer resins and fall within the technical area recited by Miller. (Ans. 6; Miller, col. 5, ll. 34-38.)
24. To further clarify the non-critical or obvious nature of using the spray deposition process, as stated in applicant’s own specification on page 8, paragraph 28, and on page 9, lines 11 -15,

[i]t should be noted that the substrate 203, the protective layer 225, and the shielding layer 227 can each be created using the techniques disclosed in the Miller patent referenced above. Because these structures do not require a high degree of resolution, however, these structures can also be formed using less precise techniques, such as simply dipping the fiber 203 in a liquid form of the material to be used for the substrate 203,

the protective layer 225, or the shielding layer 227. *These structures can also be formed by, e.g., conventional gas deposition, spraying, or any other suitable technique (page 8, paragraph 28, instant specification).*

*Thus those of ordinary skill in the art will understand that, according to the teachings of the invention, any structure that can be fabricated using the Miller technique or other suitable technique can be formed on a fiber in such a way that the fiber may be subsequently woven into a fabric for clothing or other articles of wear (page 9, lines 11-15, instant specification).*

(Ans. 6-7.)

25. Miller teaches the use of “direct deposition process is suitable for polymer resin surfaces (synthetic fibers are clearly polymer resin surfaces) and the advantage is a very precise method to deposit electronic components onto very small areas.” (*Id.* at 7.)

26. Miller acknowledges that as “packaging size continues to shrink, it is increasingly difficult to apply solder to the points of interconnection. Although solder jetting technologies will work for some intermediate size electronics packages, the direct deposition of solder onto small interconnects is crucial to further miniaturization of packaging.” (Miller, col. 15, ll. 22-27.)

27. The Examiner concludes:

it would have been obvious to one of ordinary skill in the art at the time of invention to modify the Post article to use a spray deposition process as taught by Miller rather than soldering, for more precisely depositing electronic materials onto small areas such as fibers to be woven into fabric articles.

(Ans. 7.)

## PRINCIPLES OF LAW

In making an obviousness determination over a combination of prior art references, it is important to identify a reason why persons of ordinary skill in the art would have attempted to make the claimed subject matter. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). When making such a determination, the scope of the prior art and level of ordinary skill must be considered. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. . . . [A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

*KSR*, 127 S. Ct. at 1741-42.

## ANALYSIS

As to the issue of motivation to combine the cited references we note that Post teaches soldering an electronic component to a fiber. Miller teaches that as “packaging size continues to shrink, it is increasingly difficult to apply solder to the points of interconnection. Although solder jetting technologies will work for some intermediate size electronics packages, the direct deposition of solder onto small interconnects is crucial to further miniaturization and of packaging.” (Miller, col. 15, ll. 22-30; (FF25).) Thus Miller suggests to one of ordinary skill in the art replacing normal soldering techniques as described in Post (FF4) for jetting or deposition soldering techniques described in Miller to assist in miniaturization of components.



Thus, we find the record before use provides a proper reason to combine the cited references.

#### CONCLUSION OF LAW

The cited prior art, in combination, discloses spray deposition of electronic materials, and is there motivation to combine the cited references.

#### SUMMARY

The anticipation over Post is affirmed, except as to claims 6, 8, 16, and 18 which are reversed. The anticipation rejection over Carroll is affirmed. The obviousness rejection of the claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

#### AFFIRMED-IN-PART

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